Citation:

Hui LL, Nelson EA. Meal glycaemic load of normal-weight and overweight Hong Kong children. *Eur J Clin Nutr*. 2006 Feb; 60(2): 220-227.

PubMed ID: 16278694

Study Design:

Case Control Study

Class:

C - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To assess the contribution by different foods to the total meal glycemic load over a day, and to determine whether the calculated meal glycemic load of the current diet was associated with childhood overweight.

Inclusion Criteria:

Children aged six to seven years who participated in a case-control study to identify the risk factors for childhood overweight and completed three-day dietary records.

Exclusion Criteria:

None.

Description of Study Protocol:

Recruitment

- Children were recruited from February 2000 to May 2000 when they attended one of 12 Student Health Service Centrex of the Department of Health for an annual body check
- Three distinct weight groups were recruited (high, middle, low).

Design

Case-control study of meal glycemic load of overweight and normal weight children.

Dietary Intake/Dietary Assessment Methodology

Three-day dietary records were completed and meal glycemic load was calculated.

Statistical Analysis

- The association between characteristics of children and tertiles of meal glycemic load were explored by analysis of variance (for continuous variables) and chi-square tests for (for categorical variables)
- The glycemic load and daily macronutrient consumption by different weight groups were assessed by analysis of variance
- Logistic regression was used to assess the effect of mean glycemic load on being overweight, after adjustment for risk factors for childhood overweight.

Data Collection Summary:

Timing of Measurements

- Weight and height were measured at the health centers
- Three-day dietary records were completed prior to the home interview.

Dependent Variables

Weight groups [overweight [92nd percentile or more for body mass index (BMI)]; middle weight (45th to 55th percentile for BMI); low weight (eighth or less percentile for BMI)].

Independent Variables

Average meal glycemic load: Average of the glycemic load of the three main meals.

Control Variables

- Paternal obesity
- Maternal obesity
- Birth weight
- Sleeping duration
- Mean energy intake
- Father as a current smoker.

Description of Actual Data Sample:

- *Initial N:* 316
- *Attrition (final N):* 316
- *Age:* Mean ± SD of 6.7±0.3 years
- *Ethnicity:* Chinese
- *Anthropometrics:*
  - The mean BMI ± SD for the overweight (N=121), middle-weight (N=130) and low-weight (N=65) groups were 20.5±2.1, 15.0±0.2, and 12.8±0.3 kg/m^2, respectively
  - In all, 98.5% of the children in the overweight group had a BMI of at least 25kg/m^2, and all but one of the children in the low weight group was within the normal weight range (80% to 120% median weight for height)
- *Location:* Hong Kong.

Summary of Results:

Odds Ratios for Overweight by Meal Glycemic Load

	Meal Glycemic Load First Tertile	Meal Glycemic Load Second Tertile	Meal Glycemic Load Third Tertile	P-value for Trend
Adjusted* odds ratio (95% CI)	1.00	1.01 (0.51 to 2.01)	1.08 (0.52 to 2.26)	0.832

*Adjusted for paternal obesity, maternal obesity, birth weight, sleeping, mean energy intake and father as a current smoker.

Key Findings

- After adjustment for factors previously shown to be associated with childhood overweight, there was no association between meal glycemic load and overweight
- Children with higher glycemic load were likely to have greater consumption of energy (P<0.0005), carbohydrate (P<0.0005) and protein (P=0.003), but not fat (P=0.215)
- Snacks contributed to a quarter of the total glycemic load
- Total glycemic load (all meals and snacks) was not associated with childhood overweight.

Author Conclusion:

After adjustment for risk factors for overweight, the meal glycemic load was not significantly associated with childhood overweight.

Reviewer Comments:

Author-identified limitations/comments:

- *Dietary intakes vary day-to-day, so the three-day records may not be representative of subjects' usual nutrient intake. Under-reporting, especially for overweight children, of unhealthy foods might underestimate the actual intake*
- *The dietary habits of the children may have changed as a result of their weight status, so the current diet may not reflect the diet when the child was becoming overweight.*
- *The precise glycemic index of many local Chinese foods is not known. Some factors that might influence the true glycemic load of a meal were not considered, including cooking method, physical form of the food, meal combinations and eating rate*
- *Long-term intervention studies are needed to determine the potential causal association between glycemic index and obesity in children.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions

1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	No
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	No
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes

3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	N/A
4.1.	Were follow-up methods described and the same for all groups?	N/A
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	N/A
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	N/A
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	No
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	No
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	N/A
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A

6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	N/A
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	No
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes

9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes